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In re application: Apple et al.

Serial No.: 09/451,574

Filed: November 30, 1999

For: Dual Concentric Robotic High
Performance Automated Tape Cartridge
System

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Group Art Unit: 3652

Examiner: F. E. Werner

Attorney Docket No.: 99-049-MIS

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Assistant Commissioner for Patents
Washington, D.C. 20231

ATTENTION: Board of Patent Appeals
and Interferences

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By: Cheryl L. Hewitt
Cheryl L. Hewitt

APPELLANT'S BRIEF (37 C.F.R. 1.192)

This brief is in furtherance of the Notice of Appeal, filed in this case on 6/21/2002.

The fees required under § 1.17(c), and any required petition for extension of time for filing this brief and fees therefore, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief is transmitted in triplicate. (37 C.F.R. 1.192(a))

REAL PARTIES IN INTEREST

The real party in interest in this appeal is the following party: Storage Technology Corporation.

RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interference's that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal, there are no such appeals or interference's.

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STATUS OF CLAIMS

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are: 1-22

B. STATUS OF ALL THE CLAIMS IN APPLICATION

1. Claims canceled: 8-21
2. Claims withdrawn from consideration but not canceled: None
3. Claims pending: 1-7 and 22
4. Claims allowed: None
5. Claims rejected: 1-7 and 22

C. CLAIMS ON APPEAL

The claims on appeal are: 1-3, 5-7, and 22

STATUS OF AMENDMENTS

No amendments were submitted after the final Office Action. A proposed amendment is included herewith to cancel Claim 4, solely for the purpose of removing issues under appeal.

SUMMARY OF INVENTION

It is common in a tape library to arrange the storage area(s) so that a single robotic arm can access a large number of tapes. The storage areas are advantageously arranged in a regular polygon that approximates a circle.¹ The storage areas open inwardly, so that the robotic arm can be installed in the center of a storage area and reach all the tapes it is responsible for. The arm will carry the tapes between their storage location and a tape drive in the storage area, where they will be read or written, or else it will pass the tapes to a robotic arm in an adjacent storage area, so that the tape eventually reaches a tape drive. However, when tape usage is high, there may be a larger number of requests than this system can handle in a timely fashion.²

The instant application discloses a number of configurations for two robotic arms within the same polygonal tape library area, both robotic arms serving all areas of the library area. In the presently preferred embodiment, the two robotic arms are mounted so that they share the same axis of rotation. This can be accomplished in several different ways. In one embodiment, one robotic

¹ Application, page 7, lines 14-25

arm can be mounted to the floor of the storage area, while the second arm is mounted to the ceiling. Alternatively, a central column can carry the two separate drive mechanisms, with the column controlling rotation for the first arm mounted inside the column controlling rotation for the second arm.³

To allow for further expansion, the application discloses several further embodiments that allow for mounting additional robotic units within a single storage area, with three specific embodiments shown. In the first embodiment, four robotic units are mounted to a central column. Two of the robotic units serve an inner storage area that faces outward, while two other units serve the regular, inward-facing storage area. The second embodiment discloses four independently operating robotic arms, all mounted to a central column and all able to access the entire, inwardly opening library module. The control columns for rotation of each robotic unit are nested inside each other in the central column. In the final embodiment shown, four robotic arms are separately mounted in slightly off-center positions in the module. In this embodiment, each of the four robotic arms serves a portion of the total library, with areas of overlap between each of the adjacent robotic units to allow them to optimize operations.⁴

ISSUES

1. Claims 1-3, 5-7, and 22 are rejected under U.S.C. 112(2) as indefinite.
2. Claims 1-3, 5-7, and 22 are rejected under U.S.C 103(a) as obvious over Cheatham in view of Sander or Mason.
3. Claim 22 is rejected under U.S.C 103(a) as obvious over Japanese Patent 405040505.

GROUPING OF CLAIMS

Claims 1-3 and 5-7 should be considered separately from Claim 22. All claims are directed to robotic arms with hands adapted to manipulate storage units from a library. However, Claims 1-3 and 5-7 are directed to two robotic arms attached to a central column, while Claim 22 is directed to the broader scope of two robotic units within the same library unit.

² Application, page 1, line 16 through page 2, line 25

³ Application, page 7, line 26 through page 17, line 19

⁴ Application, page 17, line 20 through page 19, line 8

ARGUMENT

1. Claims 1-3, 5-7 and 22 are rejected under U.S.C. 112(2) as indefinite.

The Examiner has stated that

“Re base claims 1 and 22, no library (cell) structure (shelves, wall, etc.) has been set forth, moreover, no motive means to move the arms, hands, etc, (claim 1) or robot (claims 22) has been set forth; also re claim 22, no means has been set forth to mount the robot units and re base claims 1 and 22, it is not understood what function occurs during the manipulation of the storage units.”

It is very respectfully asserted that the Examiner is attempting to impose enablement limitations on the claims under the guise of indefiniteness. With regard to the comments on “library structure” and “motive means”, the Examiner has not stated that these items are unclear in their meaning; rather he notes that they are not recited. It is noted that claims are not required to be enabling; only the specification is required to enable. The claims are required to be clear and unambiguous, which it is asserted that these claims are.

It is not the role of the claims to teach one skilled in the art to reproduce the invention, but rather to define the legal metes and bounds of the invention. *In re Rainer*, 305 F.2d 505, 509, 134 U.S.P.Q. 343, 346 (C.C.P.A. 1962). If the metes and bounds of the claimed invention are clearly ascertainable, then the claim cannot be properly rejected as “vague” or “indefinite” under 35 U.S.C. § 112, second paragraph.

Whether the claim leaves unclear the manner in which [a feature] may be implemented is irrelevant where the claim clearly covers all forms of implementation. *In re Warmerdam*, 33 F.3d 1354, 1361, 31 U.S.P.Q.2d 1754, 1759 (Fed. Cir. 1994).

Regarding the Examiner’s statement that it is not clear what function occurs when the storage units are manipulated, it is submitted that the word “manipulated” has a clear meaning in the English language. As set forth by THE NEWBURY HOUSE ONLINE DICTIONARY, available at nhd.heinle.com, to manipulate is to “*handle, [or] change the position of*”. Thus, the robotic hands can handle or change the position of the storage units of the library. One would not normally create such a structure (a robotic unit with arms and hands) without a purpose in mind, such as carrying the storage units to and from a drive, but it is not necessary to state that purpose in the claims. This rejection should be reversed.

2. Claims 1-3, 5-7 and 22 are rejected under U.S.C. 103(a) as obvious over Cheatham in view of Sander or Mason.

It is submitted that this rejection should be overturned for at least two reasons: a) Sander and Mason are not analogous art to the presently claimed invention, and b) there is no motivation provided that would be recognized by one of ordinary skill in the art. These reasons will be discussed below.

In the final office action, the Examiner stated that

“Cheatham et al disclose in at least figure 1, an unnumbered center column (floor mounted) along axis 30, opposed first and second arms 28 rotatable along the column, raisable/lowerable hands 12a and 12b, etc. mounted on the arms and cellular library 44, etc., but do not disclose independently movable hands and arms which is disclosed by Sander (28, 30, etc.) or Mason (18, 20, 36, 101, etc.) and in view of the same, it would have been obvious to have substituted separate rotatable arm mountings to increase the flexibility of the apparatus as taught by either secondary reference. Re claim 2, it would have been obvious to have substituted conventional equivalent ceiling mountings of the first column, if desired, as this would have been known warehouse mountings of manipulators.”

Applicant has asserted that Sander and Mason are non-analogous art. In the final rejection, the Examiner's response was to state that Applicant's arguments

“are not well-taken since each of Cheatham et al, Sander and Mason are each directed to plural movable material handling transfer arms (with Sander and Mason having the teaching of independently movable transfer arms) and thus, the reference combinations would appear to be correct, analogous and obviously combinable.”

The Examiner has correctly noted that the concept of analogous art must be tied to the claimed invention, not just to the invention disclosed. However, in his comments above, the Examiner's comments are directed to only a portion of the claimed invention (i.e., “plural movable material handling transfer arms”), not to the entire claimed invention. Exemplary Claim 1, which is reproduced in the appendix, includes hands for “*manipulating storage units from the library*”. This limitation has been ignored in the question of analogous art, although it carries as much weight as do the other limitations. Now the question becomes not “*Are Sander and Mason directed to plural movable material handling transfer arms*”, but “*Are Sander and Mason directed to plural movable arms having hands that manipulate storage units from a library?*” In a human situation, one would not look for a surgeon among dockworkers, even though both have hands and manual skill; the manual skills necessary are quite different. Similarly, one would not look for the mechanical arms and hands to handle tape cartridges (or other storage units from a

library) on an undersea submersible for oilfield repairs (Mason) or on a device to aid in changing a cutting disk assembly on a slitter (Sander). It is submitted that one of ordinary skill would look to areas that are familiar, not to areas outside their sphere of knowledge. It is submitted that Mason and Sander are outside the sphere of knowledge of one of ordinary skill in the art.

The Examiner, as part of his final rejection, has asserted that Applicants were overly reliant on the specification to define the apparatus. It is submitted that the definition of “*storage*” in the Merriam Webster online dictionary, available at m-w.com, includes “*memory*”, which in turn carries the definition of “*a device or a component of a device in which information especially for a computer can be inserted and stored and from which it may be extracted when wanted*”. A “*library*”, in turn, can be “*a place in which literary, musical, artistic, or reference materials (as books, manuscripts, recordings, or films) are kept for use but not for sale*”, or “*a collection resembling or suggesting a library [such as] a library of computer programs*”. Thus, whether one looks to the specification (which is clearly directed to a tape library or similar storage situation) or to a dictionary to arrive at the meaning of the claims, it is submitted that one of ordinary skill in the art would not look to the patents of Mason or Sander to solve the problem or to reach the claimed invention.

Thus, the question is not whether we, in hindsight, can see how to piece together the invention. Rather, the question is whether someone, of ordinary skill in the art and without our hindsight, would look to the areas represented by Mason and Sanders. It is submitted that they would not.

With regard to Sander and Claim 22, this distinction of non-analogous art becomes even clearer.

22. (Once Amended) A data storage and retrieval system adapted to operate within a library service module having an array of cells configured to receive data storage units, the system comprising:

a first robot unit, wherein the first robot unit transports a data storage unit to and from the array of cells; and

a second robot unit, located within the array of cells, wherein the second robot unit, independently with respect to the first robot unit, manipulates data storage units placed in the array of cells.

In Claim 22, not only can the robot units transport a “*data storage unit*”, but the very definition of a robot, as opposed to a collection of hands and arms, means that the action is performed automatically, without needing an operator to move the arms and hands, as appears

necessary in Sander. This assertion is supported by the definition of robot from the MERRIAM WEBSTER ONLINE DICTIONARY found at www.m-w.com/home.htm. Two separate definitions are shown, each referring to the “automatic” feature of the robot. “*Robot: 2 : a device that automatically performs complicated often repetitive tasks; 3 : a mechanism guided by automatic controls*”. Thus, the assertion that Mason and Sander are non-analogous art should be sustained.

Finally, it is submitted that there is no suggestion or motivation found in the prior art that suggests the benefits of combining the innovations of Cheatham with those of Mason or Sander. The combination of elements, in a manner that reconstructs the applicant's invention only with the benefit of hindsight, is insufficient to present a prima facie case of obviousness. There must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination. That knowledge cannot come from the applicant's invention itself. In *re Oetiker*, 977 F.2d 1443, 24 U.S.P.Q.2d 1443, 1446 (Fed. Cir. 1992). It is submitted that there is no suggestion in Cheatham that two independently movable arms might be useful within the library module. Likewise, neither Sanders nor Mason appear to suggest that the idea of plural arms and hands would be useful in the setting of a library. Especially in view of the disparate work to which these different patents are directed, it is submitted that there is little motivation to combine them.

The rejection under 103(a) should be overturned, both for non-analogous art and for a lack of motive to combine.

3. Claim 22 is rejected under U.S.C 103(a) as obvious over Japanese Patent 405040505.

In his rejection of Claim 22 over the Japanese Patent above, the Examiner states:

“The Japanese Patent discloses independently movable robots 31A and 31B accessing storage units 10 in cells 2, etc. It would have been obvious to have substituted the conventional handling of equivalent storage units, such as data storage units, if desired.”

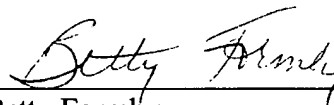
As seen in the earlier recitation of Claim 22, this claim recites two robotic units, but only one array of cells in which the data storage units are stored. The cited Japanese Patent appears to have two robotic arms, each arm having its own separate array of storage cells that it serves. This is further supported by the fact that a library unit, containing one robotic arm and its associated, semi-circular array of storage cells, can exist entirely on its own. When a second robotic arm and its associated array of cells are added, it appears that they are placed together merely to save space,

rather than from any need to be adjacent each other. They do not appear to assist each other, or to serve any of the same storage cells. Neither does this patent abstract appear to suggest a modification so that each robotic arm could serve the entire circular array. Neither has the Examiner cited any other art from which this suggestion could come. Without any suggestion to modify the Japanese patent, it remains two robotic arms serving two arrays of storage cells, rather than two arms serving the single array of storage cells, as claimed. Thus, this rejection should be overturned.

Conclusion

Thus, it is submitted that all rejections should be overturned and Claims 1-3, 5-7, and 22 should be allowed.

Sincerely,

A handwritten signature in cursive script, appearing to read "Betty Formby", is written over a horizontal line.

Betty Formby
Reg. No. 36,536
Carstens, Yee & Cahoon, LLP
PO Box 802334
Dallas, TX 75380
(972) 367-2001
Agent for Applicants

APPENDIX OF CLAIMS

The text of the claims involved in the appeal are:

1. (Once Amended) An apparatus for manipulating storage units in a library, the apparatus comprising:

a first center column having a first arm with first and second ends wherein the first end of said first arm is attached to said first center column and said first arm extends substantially radially outward from said first center column;

a first hand attached to the second end of said first arm for manipulating storage units from the library;

a second center column having a second arm with first and second ends wherein the first end of the second arm is attached to the second center column and said second arm extends substantially radially outward from said second center column; and

a second hand attached to the second end of said second arm for manipulating storage units from the library; wherein

said first arm and said second arm rotate about a same vertical axis of rotation; and each arm and hand is independently moveable from the other arm and hand.

2. The apparatus of claim 1, wherein said first center column is attached at one end to a ceiling of the library and said second center column is attached at one end to a floor of the library.

3. The apparatus of claim 1, wherein each of said hands is moveable longitudinally along a respective one of said arms.

[4. The apparatus of claim 1, wherein each of said center columns is substantially cylindrically symmetric.]

5. The apparatus of claim 1, wherein said first center column is axially disposed within said second center column.

6. The apparatus of claim 1, wherein the library comprises walls arranged around a central axis and the storage units are stored in cells in the walls.

7. The apparatus of claim 1, wherein each of said center columns is substantially cylindrical.

22. (Once Amended) A data storage and retrieval system adapted to operate within a library service module having an array of cells configured to receive data storage units, the system comprising:

a first robot unit, wherein the first robot unit transports a data storage unit to and from the array of cells; and

a second robot unit, located within the array of cells, wherein the second robot unit, independently with respect to the first robot unit, manipulates data storage units placed in the array of cells.